2014 SUSTAINABLE BUILDING TOUR

SUSTAINABLE BUILDING IN MANY SHAPES, SIZES & APPROACHES

SATURDAY, 10:00AM—2:00PM SEPTEMBER 27, 2014

This will be the 10th year for the Sustainable Building Tour!!!

2014 Sustainable Features:

* Environmental Education
* Community Enhancement
* Xeriscaping and Gardens
* Passive Solar Design & Energy Efficiency
* Rainwater/Greywater
* Solar Thermal & Solar PV panels
* Insulated Concrete Forms (ICF),
* Straw bale & Cordwood
* Recycled & Local Materials

Part of the Flagstaff Festival of Science & Solar Energy Society's National Tour

Blower Door Test

Demonstration

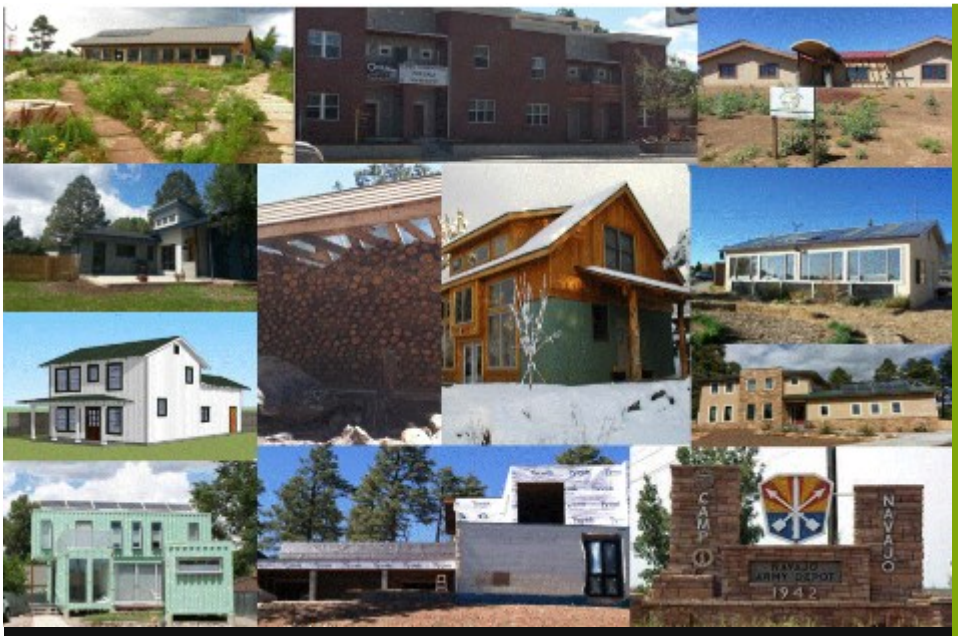
11am & 1pm

****

Spray Foam

Demonstration at the Habitat home

*** There are a few tour sites under construction. Please adhere to all safety directions on site ***



Willow Bend, Elden Townhomes, JEP Home, Orion, Fagen, Moore/Schmidt, Ponderosa School, Habitat for Humanity, Eccleston, Jones/Glotfelty, Francis, Camp Navajo

Made possible by:

- Amanda Acheson-Coconino County Sustainable Building Program Manager
- Nicole Woodman-City of Flagstaff Sustainability Program Manager
- Russell Tweed-Willow Bend Environmental Education Center Director
- NAIPTA-transportation provider
- Tour Packet provided by: Shannon Maho-CCSBP Aide & Tamara Lawless-City of Flagstaff Sustainability Specialist

The Tour Guide

This tour guide contains a short summary of the features at the 12 sites on the tour, a regional map, as well as driving directions for each location. The regional map (following) will help you orient yourself and allow you to "plot a course" for the day. A color copy of the map is available for those taking the bus. Written directions and individual maps use Willow Bend as a point of origin.

This tour is self-guided and all participants assume their own liability while traveling to, or visiting each site.

Willow Bend Environmental Education Center
Passive Solar Straw Bale Building
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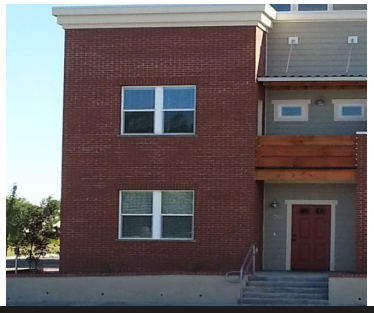

Elden Townhomes
City Infill & Redevelopment
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Northern Arizona Habitat for Humanity
Affordable Housing
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Jones/ Glotflelty Residence
Shipping Containers
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Ponderosa School
Greenhouse & Sustainable Education
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Moore/Schmidt Residence
Passive Solar Straw Bale
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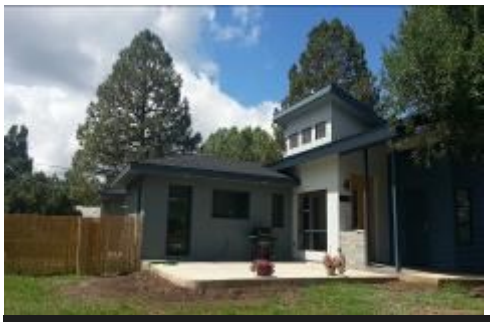

Orion Residence
Retrofit Construction
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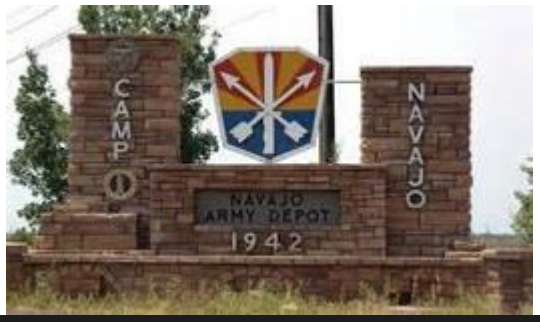

Camp Navajo
Sustainable Historic Building
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Francis Residence
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J.E.P. Model Home
J.E.P. System
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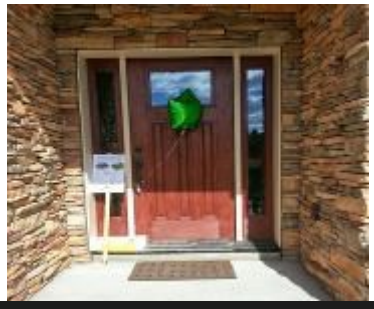

Eccleston's Residence
Renewable Energy & ICF home
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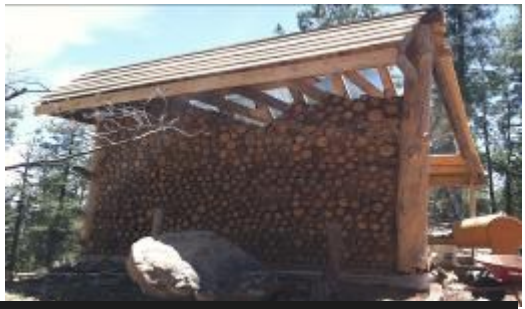

Fagan Residence
Straw Bale & Cordwood
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Award Certification Level: Advanced (2004)

Willow Bend Environmental Education Center

Passive Solar Straw Bale Building

The Sustainable Building Tour kicks-off at Willow Bend, where the tour packets are provided.

This non-profit center was founded in 1978 by the Coconino Natural Resource Conservation District. Built in 2002, this building provides the public with an example & resource for sustainable building and living.

In addition to serving as a center that practices sustainability, Willow Bend offers environmental education for kids and adults, such as hands-on learning, workshops, field trips, and events for the community.

Architect: PWM Architect

Builder: Solar Design & Construction

Sustainable features:

* Straw bale building: energy efficient, renewable and high source of insulation value, straw bale is also a waste by-product from grain harvesting
* Passive solar design: south facing windows, solar PV panels, Trombe walls: passive solar heat collector, heat stored and use at night
* Native plants and xeriscaping to help reduce watering demands supporting healthy ecosystems
* Solar PV panels: grid tied 6.2 kWh per day, donated by Prometheus Renewables, Inc.
* Rainwater harvesting system collects and distributes to low-water garden
* Energy efficient: blown-in fiberglass at ceiling (R-50) & CFL lighting with natural day lighting

Willow Bend
environmental education center
founded by the
Coconino Natural Resource Conservation District

Elden Townhomes

City Infill & Redevelopment

Hope Construction's new project incorporates infill development in the city of Flagstaff. Sustainability practices include an Energy Star rating and a Home Energy Rating System (HERS) of 55.

Each unit is approximately 2,000 square feet with 3-bedrooms, a loft area, 2-car garage, and a spectacular view of the San Francisco Peaks!

The location of the townhomes. It is within walking distance to the Aspen Place at the Sawmill establishment, NAU, downtown and other nearby shopping areas.

Architect: Shapes and Forms, LLC

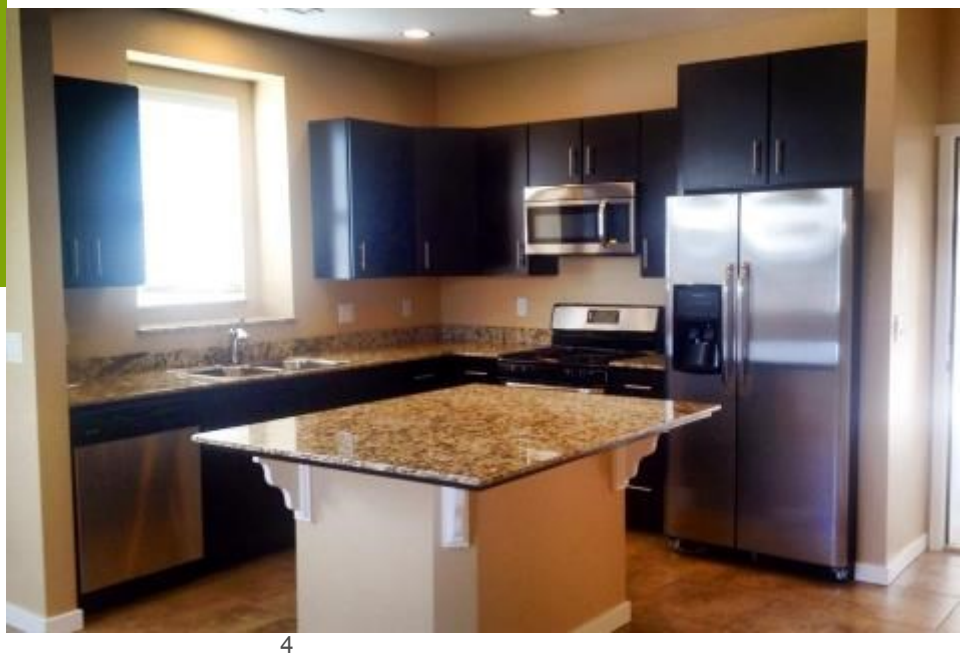
Builder: Hope Construction

Energy Consultants: E3 Energy

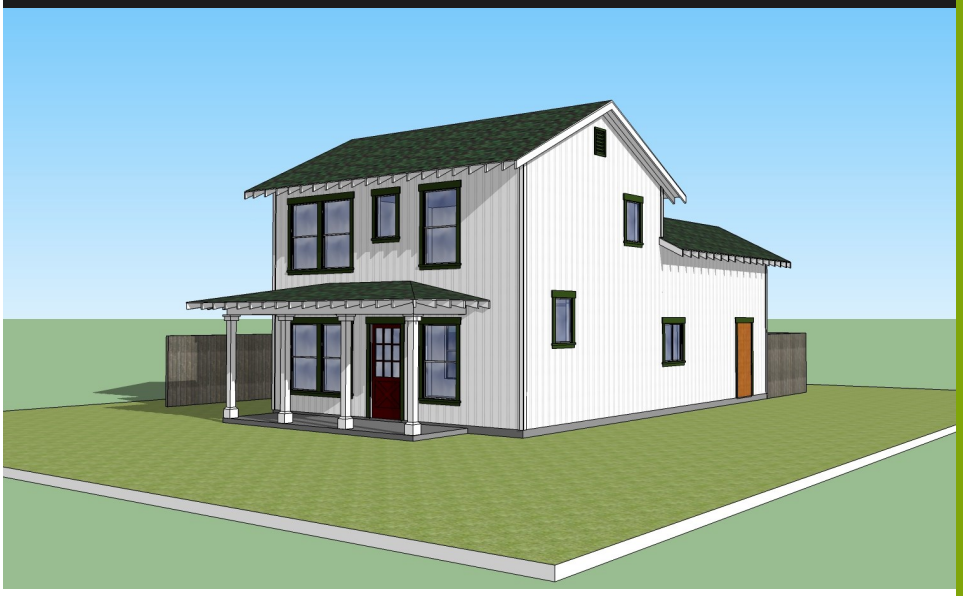
Award Certification Level: Intermediate

Sustainable features:

* High density development, city infill
* 1-unit available as affordable housing (City Land Trust)
* Outdoor living space provided at rooftop with privacy screens
* Preservation of mature trees with Native Plant and Seed
* Non-chemical pesticide used on site (BoraCare)
* Units are prewired for solar PV panel connections
* Advanced framing to minimize lumber material and maximize insulation efficiency
* Waste reduction of construction materials
* Low-flow fixtures and toilets, Energy Star appliances



Award Certification Level: pending



Habitat for Humanity- Verde St. Project

Affordable Housing

Northern Arizona's Habitat for Humanity has collaborated with local building professionals that are donating labor and materials for this project along with volunteers to help build this home.

*****Spray Foam Demo*** provided by:**

ECO-PRO COATINGS and PAINTING

Owners: Jacobs Family

Builder: Habitat for Humanity/North Pines, LLC

Architect: Karl Eberhard

Sustainable features:

- Affordable housing, with volunteer to help cut cost in labor
- Spray foam insulation to minimize energy cost for heating and cooling
- Energy efficient appliances and lighting
- Low-flow fixtures and toilets for water conservation
- Located in high density area and near local shopping, recreation, & urban trails
- Small house design with an open floor plan
- Rainwater collection implemented for irrigation

Habitat for Humanity® of Northern Arizona

Jones/ Glotfelty Residence

Open from 12p-2p

Shipping Containers

Inspired by passing trains hauling colorful shipping containers, the owners envisioned reusing some for their Southside home.

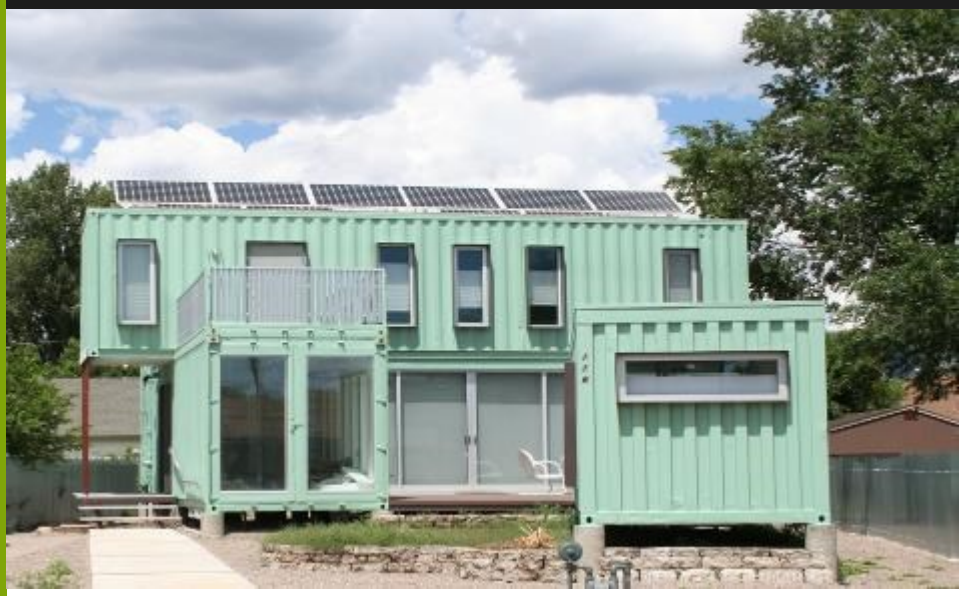
Six shipping containers are from a facility in Phoenix who performed preliminary modifications. Walls were furred out in steel lumber and insulated with high density spray foam on the inside and reflective ceramic coating on the outside. Construction took two years and was completed in June of 2011.

Owners/Designers: Marie Jones & Marvin Glotflety

Architect: Anthony Brown & Tom Hahn ECOSA Design

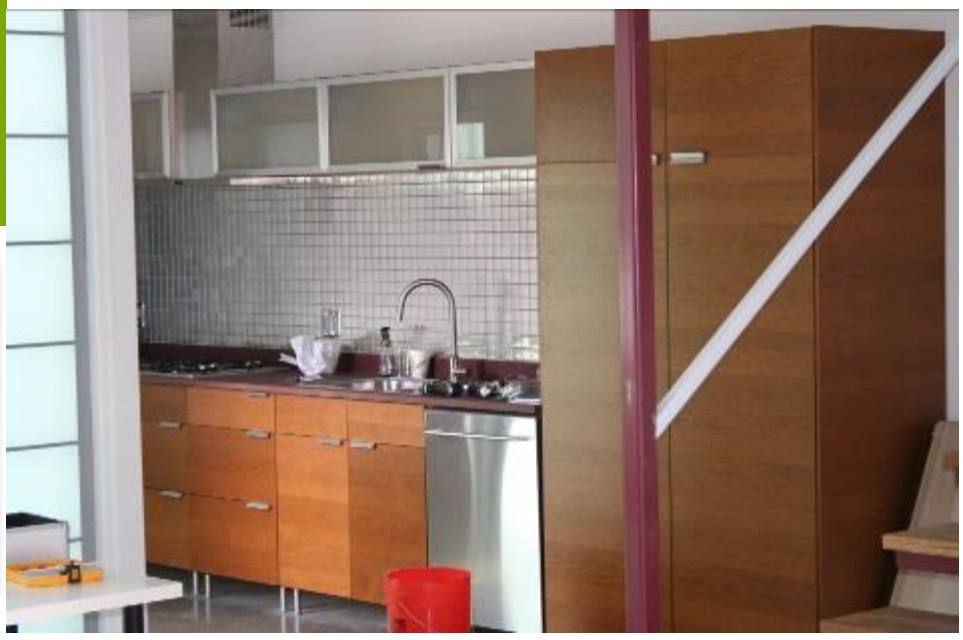
Builder: Dan Miller

Award Certification Level: Advanced (2010)



Sustainable features:

* 4,000 gallon rainwater cistern for site distribution to vegetation and gray water reuse system
* Passive solar design: 16 PV panels with remote monitoring technology to control energy system with smartphone
* Maximum day-lighting: Kalwal clerestory and translucent walls
* Radiant floor heating split in 4 zones
* Re-use of concrete waste as “urbanite” rock for landscaping
* Energy Start appliances, smart wiring, durable metal roofing
* City infill with innovative design



Award Certification Level: Community Model (2012)

Sustainable features:

* Student involvement with sustainability projects and education
* Wind and solar energy on-site
* Cold frame greenhouse: composting, vermiculture, fruit & vegetable garden
* 2400 gallon water cistern, water capture & filtering to recharge ground water
* Diverse animal habitat for small animals (frogs, gophers, snakes, etc.)
* Curb cuts capturing and filtering street pollutants and recharging ground water

Ponderosa School

Greenhouse and Sustainable Education

The Sustainability Demonstration Project site at Ponderosa High School is a place where students are able to gain hands-on educational experience in sustainable land stewardship practices as part of the school's science curriculum. Students reflect the broad cultural diversity found in Coconino County. Each semester sees new and returning students. They each contribute to a cultural legacy of land stewardship that aims to serve the entire community.

Principal: David Roth

Sustainable Educators: John Taylor, Rachel Steagall

Moore/ Schmidt Residence

Passive Solar Straw Bale Home

LEED AP Paul Moore is a local sustainable architect in the Flagstaff community. Paul's wife, Nina Schmidt also works in the building industry, designing waste water & grey water systems.

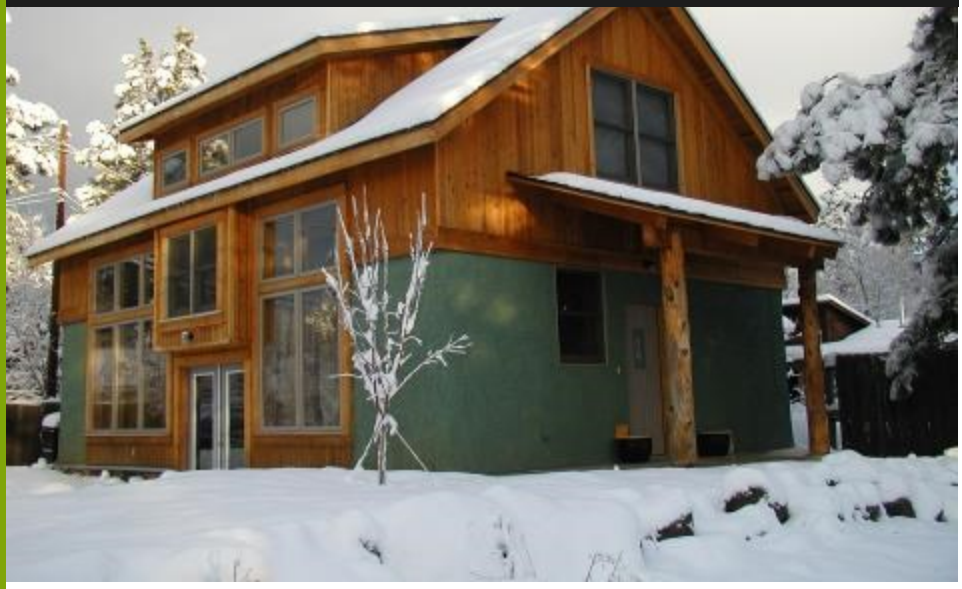
This passion and knowledge of sustainable building can be seen throughout the community including their beautiful two bedroom home with a studio and home office.

Owner: Paul Moore & Nina Schmidt

Architect: PWM Architect

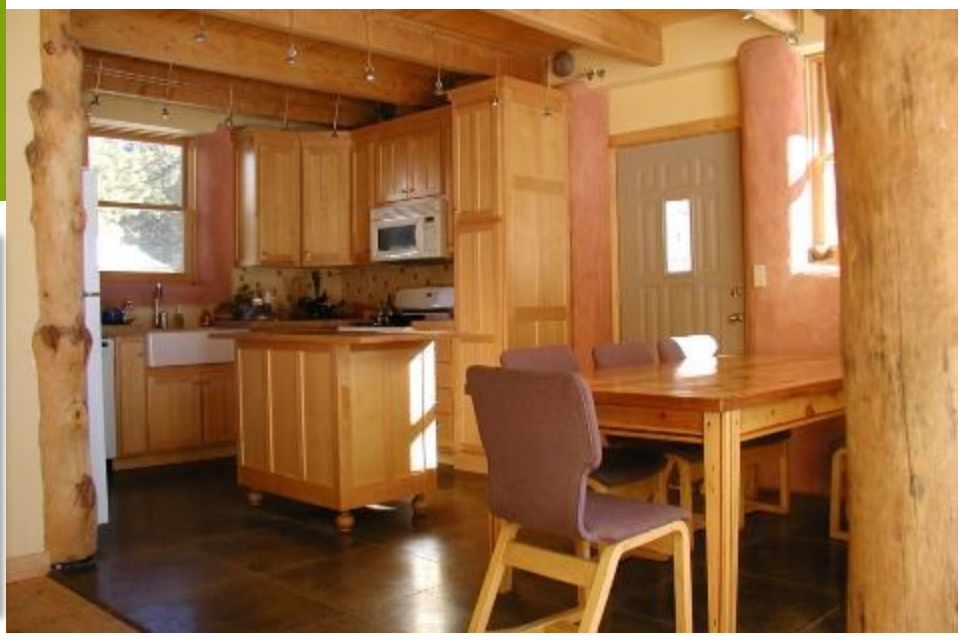
Builder: Western Strawbale Builders

Award Certification Level: Advance (2008)

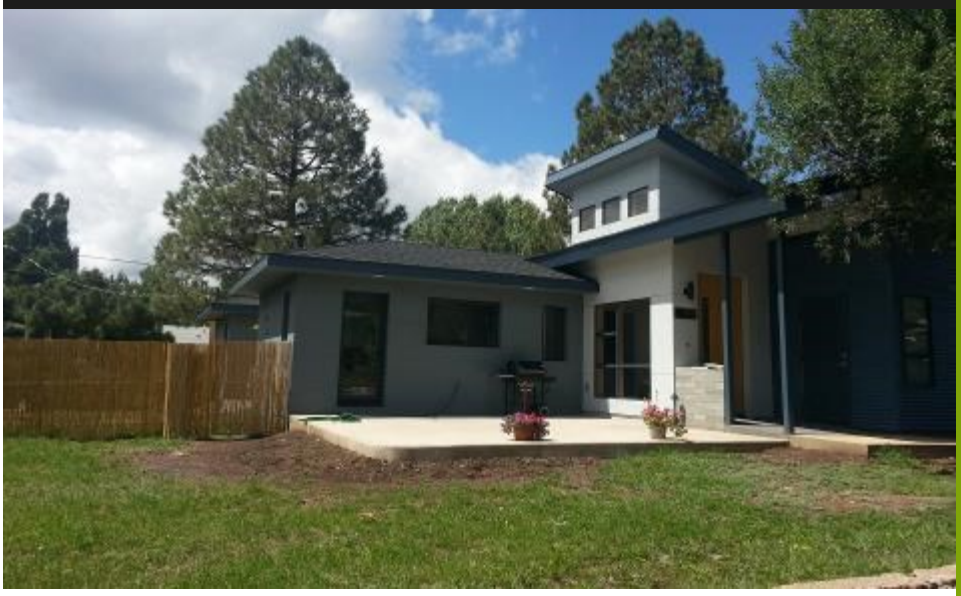


Sustainable features:

* Constructed on previously developed land: preserving green space, topsoil preservation
* Passive solar design: summer shading, natural day-lighting system, winter solar heat gain
* Straw bale construction with high R-value insulation in walls and ceiling
* Gray water irrigation system for xeriscaping yard
* Outdoor connectivity living space
* Small and efficient floor plan
* Recycled content siding, regionally quarried & processed stone
* Regional materials, low VOC finishes, formaldehyde-free OSB, CFL lighting, recycled exterior siding

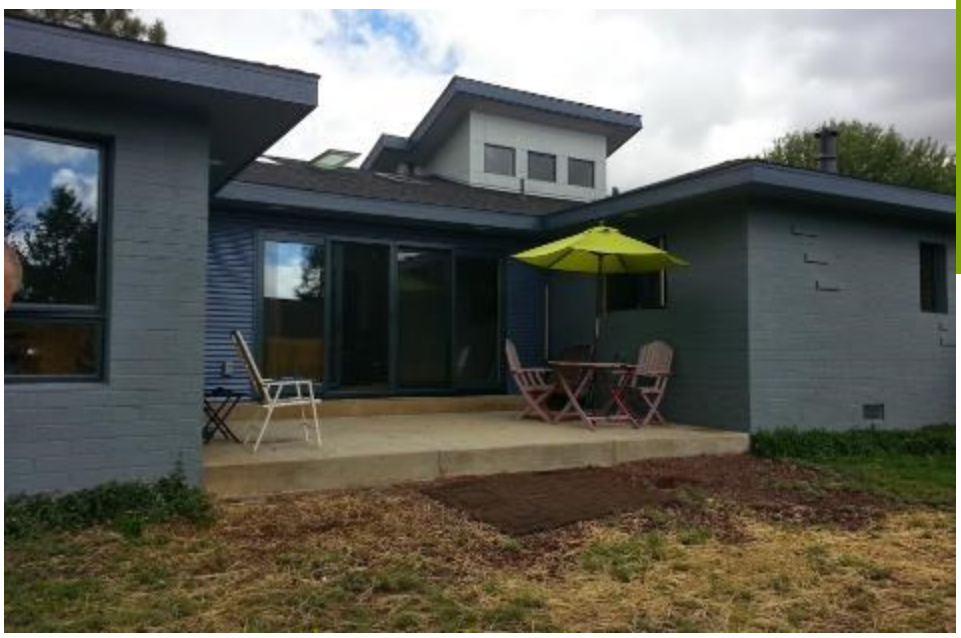


Award Certification Level: Advanced Plus



Sustainable features:

* Steel stud furred out with spray foam (open cell)
* Blower door test performed before drywall installed, testing for any leaks
* Natural day-lighting: clerestory windows, skylights, south facing windows
* Indoor air quality: low VOC finishes, radon tested and fresh air ventilation through an Energy Recovery Ventilator
* Richlite counter tops made from recycle paper
* Construction waste management: recycled concrete, reused existing block
* Rainwater distribution on landscape to improve drainage ways
* Solar ready home making it easier to connect to solar PV at a later date



Orion Residence

Retrofit Construction

A retrofit project is sustainable because modifications can be made to an existing building to improve the energy & water efficiency. Sustainable materials and methods can be newly equipped and installed.

This site will have a Blower Door Test demo on the day of the tour. A home performance test identifies air leaks, making them easier to seal. This greatly increases the energy efficiency & comfort of the home.

Owner: Sam Buchika & Christie Dennis

Builder: Ridgetop Construction-Debra Fisher

Architect: Architectural Design Studio-Aude Stang

Blower Door Test by Building Energy Performance 11am & 1pm

Building Energy Performance

Award Certification Level: Community Model

Building 1-
Designer: WH Pacific, Mary Ann Modzelewski, AIA-Senior Architect, Mesa Arizona
Builder: Haydon Building Corp, Tom Wells, CPC, Phoenix, Arizona

Sustainable features:

* Design-Build method to achieve U.S. Green Building Council (USGBC), Leadership Energy & Environment Design (LEED-NC: New Construction & Major Renovation) Silver certification
* Design-Build goals: 30% water usage reduction, 75% reuse of building materials, 20% energy reduction, 75%+ of recycled construction waste, 50% of landscape water use
* Camp Navajo Headquarters/Maneuver Training Center-Light (MTC-L), 12,870 sf building constructed of wood from the local forest
* Motion sensor lights and monitoring systems to measure energy consumption
* Low VOC adhesive, sealants and paints

Fire Station
Designer: Hunt and Caraway Architects, Ltd Phoenix, Arizona
Builder: Caliente Construction, Mesa, Arizona

Camp Navajo

Sustainable Historic Building

Originally established as Navajo Ordnance Depot in 1942 as a federal ammunition storage facility, it is now a training site for all branches of the military and a world class materials storage and handling facility.

AZARNG strived for sustainable historic preservation of this Northern Arizona landmark. Renovation plans focused on making minimal changes by updating the building system and accommodating life, safety and security needs.

The leadership of the AZARNG wanted to demonstrate that historical buildings can be saved through sustainable historic preservation techniques, and that LEED efficiencies could also be achieved .

As of January 2011, the AZARNG has two buildings awarded with LEED certification; Field Maintenance Shop (FMS)-Florence, AZ, LEED Gold. The other is a Fire Station-Camp Navajo, Bellemont, AZ, LEED Silver.

Francis Residence

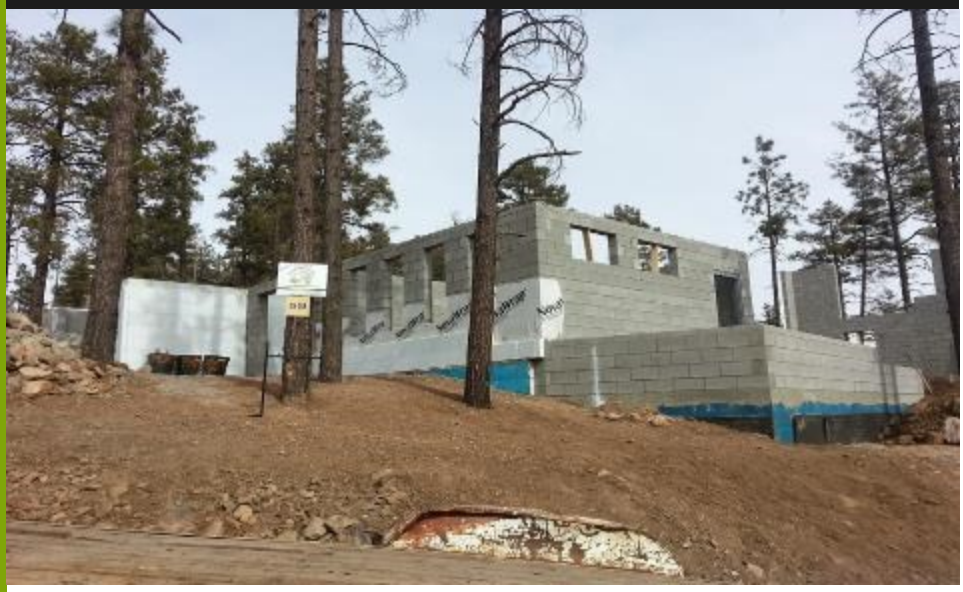
Net-Zero Energy Home

Inspired by the Pueblo Bonito from Chaco Canyon the goal of this home is to be a net-zero energy home. Built with cinder blocks and Quad-lock system with cinder infill to maximize thermal mass. The home is structurally adaptable with flexible space. Natural ventilation for cooling and air circulation with smart thermostats for floor and air sensors will allow for the indoor air to stay at 65*F to 75*F year round. Smart meters will help track Net metering.

Owner/Designer: Alan Francis

Builder: Stilley Tulloss Design Build-Mike Tulloss

Award Certification Level: pending



Sustainable features:

* Goal of Green Globes and Living Building Challenge certification
* Quad-lock: durable with high insulation, energy efficient with high thermal mass
* Passive solar with solar PV and solar thermal systems
* Integrated local materials to minimize carbon footprint: cinder blocks, stones, rammed earth
* Multigenerational dwelling: 1st level is ADA accessible, designed for future additions as needed
* Water catchment systems: rainwater and gray water, cistern built into attached greenhouse
* Building Information Model performed for design
* Natural & mechanical ventilation strategy
* Nano walls which open to courtyard for outdoor connectivity

Award Certification: Advanced Plus

JEP Model Home

J.E.P System

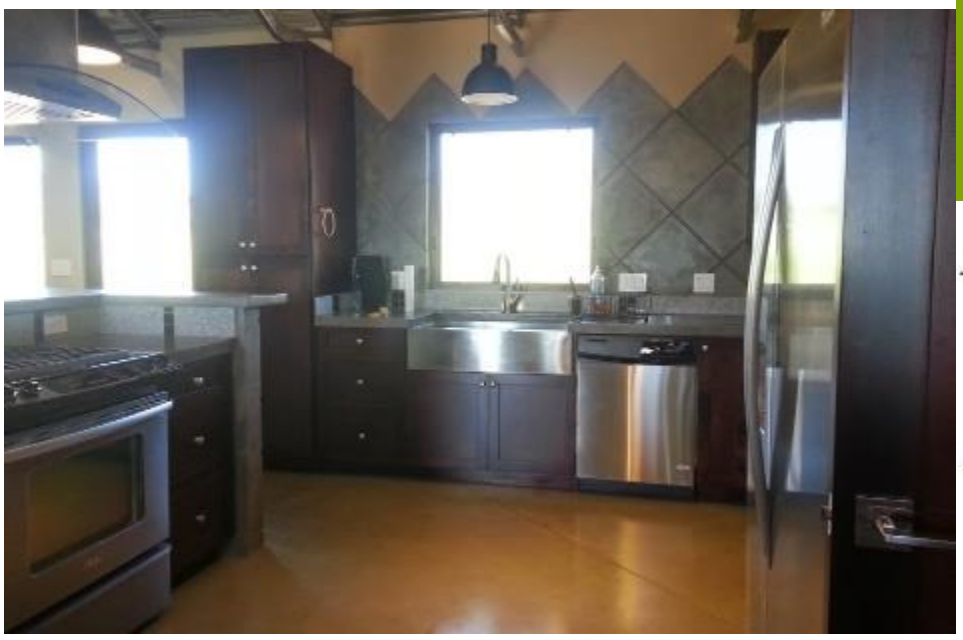
The J.E.P building envelope system uses a light structural steel frame, expanded polystyrene foam core, and a synthetic blend plaster system that is all patented. It has high thermal efficiency, fire resistant and helps lower energy cost.

Sustainable features:

* Certifications: 5 Star Energy Star, Energy Star Indoor Air Plus
* Passive radon ventilation system
* J.E.P system (patented)-superior thermal efficiency
* Small and efficient house design with open floor plan
* Rainwater collection and distribution
* Pre-plumb for grey water irrigation system
* Ground mount solar PV (12 solar PV panels) with micro-inverter
* Durable & regional materials: steel, stone, concrete, lumber, block, plaster

Owners: High Caliber Construction, LLC

Designer/Builder: High Caliber Construction, LLC



Eccleston's Residence

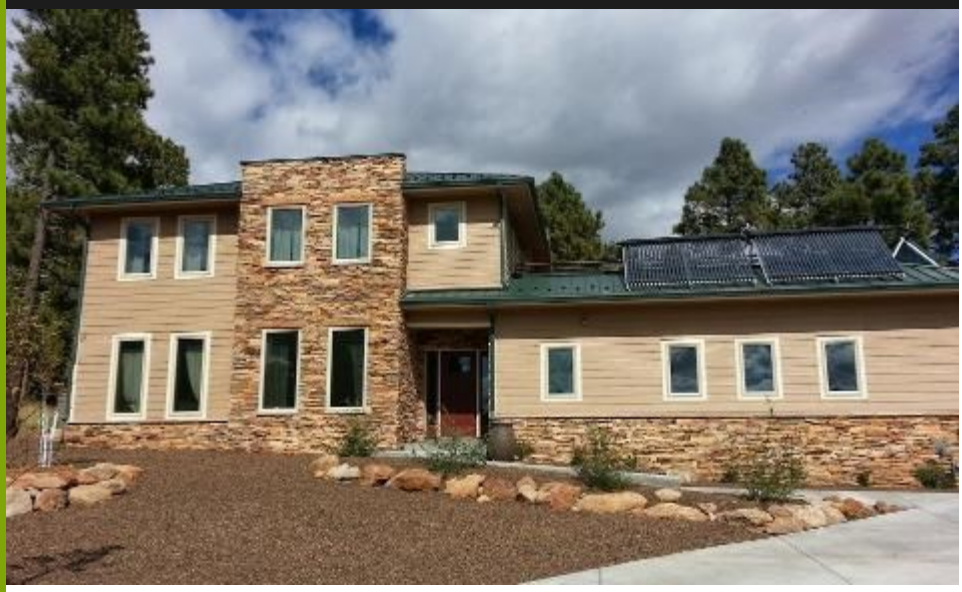
Energy Efficient & ICF Home

Its been nearly a year that the Eccleston's have lived in their new sustainable home. A year in review shows that they have maintained a gas bill below $25/month, rainwater collections allowed for less than 25 gallons of water per person per day!!! They still continue to add sustainability features to their home. Recently, plumbing for the grey water system was completed, taking care of a large portion of their landscaping irrigation needs. They recently installed a PV system which utilize solar energy.

Owner/Builder: Bobby & Cheryl Eccleston with Barden Home Builders

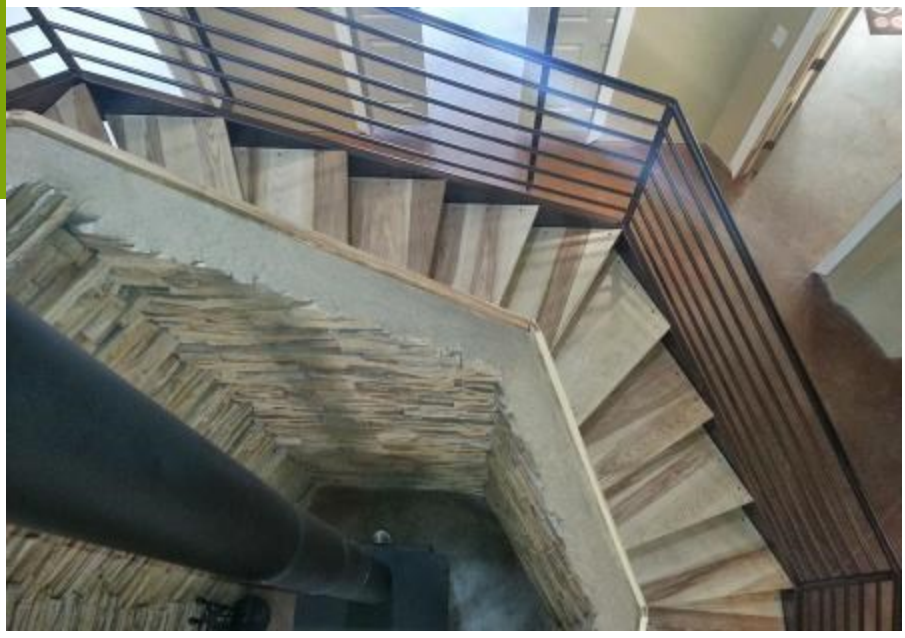
Architect: Terry Averill

Award Certification Level: Advanced Plus (2013)



Sustainable features:

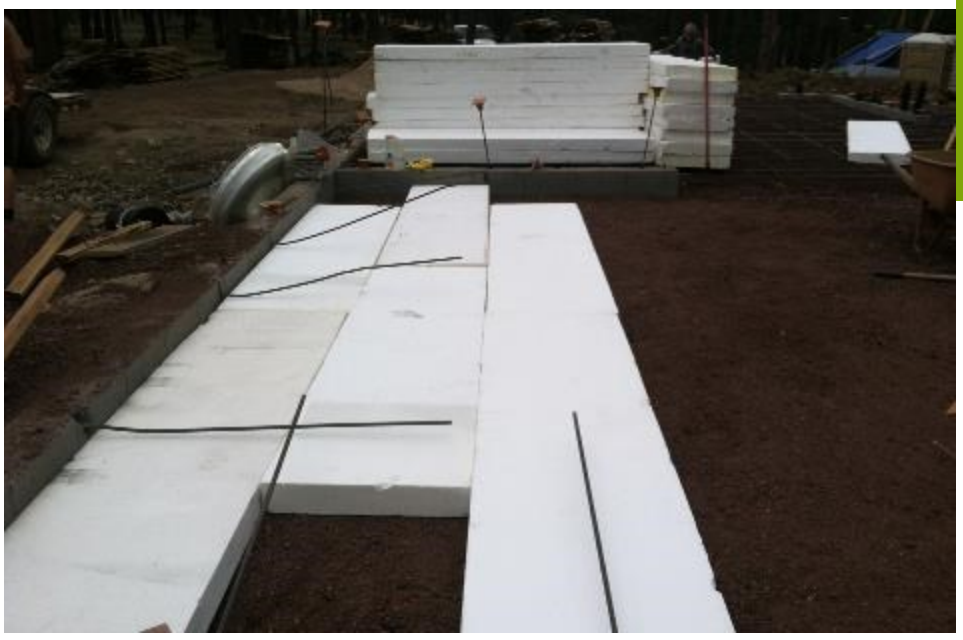
* Insulated Concrete Forms (ICF) construction
* Evacuated solar tubes for solar thermal heating to provide domestic hot water and radiant in-floor heating
* PureWash Eco-Friendly laundry system
* Passive solar design for solar heat gain and natural day-lighting
* Rainwater harvesting and gray water systems
* Energy Star appliances, LED lighting, low-flow faucets and showerheads
* Outdoor living space with access to urban trails
* Featured on Channel 12 News for Earth Day!



Award Certification: Pending

Sustainable features:

* Straw bale construction with cordwood garage
* Wood from site milled on-site and stamped by AP Sawmill and used as studs, posts & cordwood
* Recycled, salvaged and earthen materials throughout
* Exterior earthen lime plaster
* Rainwater harvesting with possible future storage
* High efficiency insulation with low/zero VOC finishes
* Solar PV system
* Whole house fan for air exchanges



Fagan Residence

Straw bale & Cordwood

****currently under construction. Please adhere to all safety directions on-site.**

Fagan Residence, is a straw bale home under construction with a cordwood garage. The cordwood construction will have 18" thick walls, sawdust insulation with mortar. Wood is gathered from the site and stamped by AP Sawmill to use for studs and posts.

Owner/Builder: John & Beth Fagan with Beyond Adobe

Designer: Solar Design & Construction

2014 Sustainable Building Tour

Sustainable Building in Many Shapes, Sizes & Approaches

Northern Arizona Intergovernmental Public Transportation Authority

Free bus fare pass to be used only on:

Saturday, September 27, 2014

Present this pass to the bus driver to get free transportation to and from tour locations.

Thank you to NAIPTA for your generosity and for providing sustainable transportation for our community!

Resource Page

Coconino County Sustainable Building Program

The mission of the CCSBP is to educate, encourage, support and help develop sustainable and energy efficient building practices throughout northern Arizona: www.coconino.az.gov/sustainablebuilding

City of Flagstaff Sustainability Program

The Sustainability Program is dedicated to promoting sustainable living and providing practical solutions to the Flagstaff community. http://flagstaff.az.gov/sustainable

City of Flagstaff Water Conservation Program

The City of Flagstaff Water Conservation Program promotes using the City's water resources wisely and implements educational opportunities for the community. http://www.flagstaff.az.gov/index.aspx?NID=31

Willow Bend Environmental Education Center

The nonprofit center's mission is to provide education outreach services that build environmental awareness and an ethic of responsible stewardship of our natural and cultural resources. www.willowbendcenter.org

Northern Arizona Branch of the US Green Building Council: www.usgbcaz.org

Northern Arizona University Office of Sustainability: http://home.nau.edu/sustain

Northern Arizona University Sustainable Energy Solutions: http://ses.cefns.nau.edu

Coconino Community College Alternative Energy Technology Degree
http://www.coconino.edu/academics/curriculum/collegecatalog/Pages/AASAlternativeEnergyTechnology.aspx
Coconino Community College Sustainable Green Building AAS Degree
http://www.coconino.edu/academics/curriculum/collegecatalog/Pages/AAS_SustainableGreenBuilding.aspx

Tax Incentives-Utility Rebate Programs

Residential and non-residential rebate and incentive programs exist through utility providers such as Arizona Public Service (APS), Salt River Project (SRP), and Unisource Energy Services (UES). Please refer to their websites for information.

APS: https://www.aps.com/en/residential/accountservices/serviceplans/Pages/green-choice-plan-options.aspx
SRP: http://www.srpnet.com/environment/earthwise/solar/Default.aspx
UES: https://www.uesaz.com/

American Solar Energy Society: http://ases.org/

American Wind Energy Association: http://www.awea.org

Arizona Solar Center: www.azsolarcenter.org

City of Flagstaff: http://www.flagstaff.az.gov/index.aspx?nid=1030

Listing of State and Federal Tax Incentives

http://www.dsireusa.org

NACET (Northern Arizona Center for Entrepreneurship & Technology)

NACET website at http://www.nacet.org/

Don't forget to recycle this packet! Or pass it on to an interested builder, homeowner, gardener, or student!

Contact Us

For more information about our services

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